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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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09/697,570 10/26/00 MATSUDA

S 15162/02660

024367
SIDLEY AUSTIN BROWN & WOOD
717 NORTH HARWOOD
SUITE 3400
DALLAS TX 75201

MMC2/0531

EXAMINER

CUEVAS, P
ART UNIT PAPER NUMBER

2834
DATE MAILED:

05/31/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/697,570

Applicant(s)

MATSUDA ET AL.

Examiner

Pedro J. Cuevas

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2000 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to because Figure 16 as referred by the specification is not present or incorrectly numbered in the filed drawings. Correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2, 3 and 5-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2 and 3 recite the limitations:

- "combined spring constant"
- "spring constant"
- "amount of displacement"
- "compression force".

There is insufficient antecedent basis for this limitation in the claim.

Claims 5 and 6 recite the limitation "displace element". There is insufficient antecedent basis for this limitation in the claim.

Claims 7-10 recites the limitation "second displacement elements" in a plurality of sentences. There is insufficient antecedent basis for this limitation in the claim.

Claims 11 and 12 recite the limitation "first displace element". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4-7 and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,947,077 to Murata.

Murata clearly teaches the construction of an actuator for moving a driven member (12), with:

- a displacement element (10)
- a drive member (P) connected to one end of said displacement element
- a stationary member (16)
- a compression member (14)

all in Figure 1; and:

- a drive circuit (Fig. 14) for driving said displacement element.

With regards to claim 4, Murata discloses an actuator, where the drive circuit drives the displacement element at a resonance frequency corresponding to signals V_P and V_Q as shown in Figure 1.

With regards to claim 5, Murata discloses an actuator, where the displace element is a laminate-type piezoelectric element as described in the specification.

With regards to claim 6, Murata discloses an actuator, where the displace element includes alternating layers of a plurality of piezoelectric thin plates (102) and electrodes as shown in Figure 10a.

5. With regards to claim 7, Murata discloses the construction of an actuator for moving a driven member (12), with:

- a first displacement element (10)
- a second displace element (Q)
- a drive member (P) connected to one end of said first and second displacement element
- a stationary member (16)
- a compression member (14)

all in Figure 1; and:

- a drive circuit (Fig. 14) for driving said first and second displacement element.

With regards to claim 10, Murata discloses an actuator, where the drive circuit drives the first and second displacement element at a resonance frequency corresponding to signals V_P and V_Q as shown in Figure 1.

With regards to claim 11, Murata discloses an actuator, where the first and second displace elements are laminate-type piezoelectric elements as described in the specification.

With regards to claim 12, Murata discloses an actuator, where the first and second displace elements include alternating layers of a plurality of piezoelectric thin plates (102) and electrodes as shown in Figure 10a.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,947,077 to Murata in view of common knowledge in the art.

Murata discloses the claimed invention except for the relationship:

$$N_t = X_O * ((1 / (1/k_2 + 1/k_3)) - (1 / (1/k_1 + 1/k_2 + 1/k_3)))$$

where k_1 is the spring constant of the compression member, k_2 is the combined spring constant of the displacement element and the drive member, k_3 is the spring constant of the driven member, X_O is the amount of displacement of the displacement element, and N_t is the compression force applied by the compression member.

It would have been obvious to one skilled in the art at the time the invention was made to use the previously stated mathematical expression, which is nothing more than the standard

formula to calculate the force of a spring, including the variables of the specific case at hand, for the purpose of determining the actual performance of the claimed invention.

8. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,947,077 to Murata in view of common knowledge in the art as applied to claims 2 and 8 above, and further in view of U.S. Patent No. 5,523,643 to Fujimura et al.

Murata discloses the claimed invention except for the relationship:

$$N_t = X_O * ((1 / (1/k_2 + 1/k_3)) - (1 / (1/k_1 + 1/k_2 + 1/k_3)))$$

where k_1 is the spring constant of the compression member, k_2 is the combined spring constant of the displacement element and the drive member, k_3 is the spring constant of the driven member, X_O is the amount of displacement of the displacement element, and N_t is the compression force applied by the compression member.

It would have been obvious to one skilled in the art at the time the invention was made to use a drive circuit to drive the displacement element at a resonance frequency on the claimed invention disclosed by Murata with the common knowledge in the art for the purpose of permitting an enhanced elliptical vibration of the transducers with a large, controllable amplitude.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- US005760527A - Jun. 2, 1998 to Ashizawa
- US005831370A - Nov. 1, 1998 to Sugaya
- US005834879A - Nov. 10, 1998 to Watanabe et al.
- US006069420A - May. 30, 2000 to Mizzi et al.
- US006201339B1 - Mar. 13, 2001 to Tani et al.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pedro J. Cuevas whose telephone number is (703) 308-4904. The examiner can normally be reached on M-T from 8:00 - 5:30; F from 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Néstor R. Ramírez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-1341 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

pjc
May 22, 2001


NESTOR RAMIREZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800